

IN THE CLAIMS:

The following is a complete listing of claims in this application.

Claims 1-13 (canceled).

14. (currently amended) A method for determining the relative position between two or more objects in a marine environment, of which at least one object can be maneuvered relative to one or more other said objects, comprising the steps of:

arranging at least one interrogator on at least one of said objects and arranging a transponder on at least one of said other objects, the interrogator being constructed and arranged for sending a radio signal to the transponder;

using the transponder to reflect a radio wave signal to the interrogator;

operating the interrogator using frequency modulated continuous wave radar;

using the transponders to bring identity tags into the radio signal reflected to the interrogator, and

carrying out attitude determination, determining range and bearing between the interrogator and transponder,

wherein:

at least one interrogator sends a radio signal to at least one transponder arranged on an object for relative positioning,

at least one transponder modulates an identifier frequency into the signal from the interrogator prior to the signal being reflected to the interrogator,

the signals from the transponders are received by a series of antenna elements in the interrogator,

the combination of the signals received on different antenna elements is used to determine the angles to the transponders in two planes relative to the antenna elements

geometry,

the signals from the transponders are processed to determine the beat frequencies and the Doppler frequencies for each transponder,

the distance and the relative velocity between the interrogator and each of the transponders are determined, which from the frequency of the carrier signal, can determine the identity of the signal and on this basis determine the position data, and

a fixed transponder is provided on the same object as the interrogator for continuous self calibration and integrity monitoring.

Claim 15 (canceled).

16. (currently amended) Method according to claim ~~15~~ 14, wherein at least one interrogator simultaneously interrogates multiple transponders.

17. (currently amended) Method according to claim ~~15~~ 14, wherein an interrogator is operated autonomously towards any transponder.

18. (previously presented) Method according to claim 16, wherein the interrogator illuminates all the transponders simultaneously.

19. (currently amended) Method according to claim ~~15~~ 14, comprising combining the distance and angles in two planes, for positioning of one or more transponders in 3 dimensions.

20. (currently amended) Method according to claim ~~15~~ 14, comprising combining the relative distance and angles with attitude determination systems, to provide an absolute determination of transponders or interrogators.

Claims 21-22 (canceled).

23. (currently amended) Method according to claim ~~15~~ 14, wherein a position determination of the interrogator from ranges is obtained, when the relative or absolute position of

the transponders is known.

24. (currently amended) System for determining the relative position between two or more objects in a marine environment, of which at least one object can be maneuvered relative to one or more other objects, comprising:

at least one interrogator using frequency modulated continuous wave radar arranged on one of the objects, and at least one transponder arranged on at least one other object, the interrogator constructed and arranged to transmit a radio signal to the at least one transponder,

the at least one transponder constructed and arranged to generate a different sideband frequency to introduce an identity tag into a signal to be reflected to the interrogator, and

a signal processing unit with software containing algorithms for determination of ranges, velocities and angles to transponders, and

a fixed transponder is provided on the same object as the interrogator, for continuous self calibration and integrity monitoring.

25. (previously presented) System according to claim 24, wherein the interrogator is implemented with non-moving elements.

Claim 26 (canceled).

27. (new) A method for determining the relative position between two or more objects in a marine environment, of which at least one object can be maneuvered relative to one or more other said objects, comprising the steps of:

arranging at least one interrogator on at least one of said objects and arranging a transponder on at least one of said other objects, the interrogator being constructed and arranged for sending a radio signal to the transponder;

using the transponder to reflect a radio wave signal to

the interrogator;

operating the interrogator using frequency modulated continuous wave radar;

using the transponders to bring identity tags into the radio signal reflected to the interrogator, and

carrying out attitude determination, determining range and bearing between the interrogator and transponder,

wherein:

at least one interrogator sends a radio signal to at least one transponder arranged on an object for relative positioning,

at least one transponder modulates an identifier frequency into the signal from the interrogator prior to the signal being reflected to the interrogator,

the signals from the transponders are received by a series of antenna elements in the interrogator,

the combination of the signals received on different antenna elements is used to determine the angles to the transponders in two planes relative to the antenna elements geometry,

the signals from the transponders are processed to determine the beat frequencies and the Doppler frequencies for each transponder,

the distance and the relative velocity between the interrogator and each of the transponders are determined, which from the frequency of the carrier signal, can determine the identity of the signal and on this basis determine the position data, and

a differential positioning between two or more transponders is carried out.

28. (new) Method according to claim 27, wherein at least one interrogator simultaneously interrogates multiple transponders.

29. (new) Method according to claim 27, wherein an interrogator is operated autonomously towards any transponder.

30. (new) Method according to claim 28, wherein the interrogator illuminates all the transponders simultaneously.

31. (new) Method according to claim 27, comprising combining the distance and angles in two planes, for positioning of one or more transponders in 3 dimensions.

32. (new) Method according to claim 27, comprising combining the relative distance and angles with attitude determination systems, to provide an absolute determination of transponders or interrogators.

33. (new) Method according to claim 27, wherein a fixed transponder on the same object as the interrogator is used for continuous self calibration and integrity monitoring.

34. (new) Method according to claim 27, wherein a position determination of the interrogator from ranges is obtained, when the relative or absolute position of the transponders is known.